

## University of Groningen

### **Consensus on the leadership of hospital CEO's and its impact on the participation of physicians in improvement projects**

Dückers, M.L.A.; Stegeman, I.; Spreeuwenberg, P.; Wagner, C.; Sanders, K.; Groenewegen, P.P.

*Published in:*  
Health Policy

*DOI:*  
[10.1016/j.healthpol.2009.01.003](https://doi.org/10.1016/j.healthpol.2009.01.003)

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2009

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Dückers, M. L. A., Stegeman, I., Spreeuwenberg, P., Wagner, C., Sanders, K., & Groenewegen, P. P. (2009). Consensus on the leadership of hospital CEO's and its impact on the participation of physicians in improvement projects. *Health Policy*, 91, 306-313. <https://doi.org/10.1016/j.healthpol.2009.01.003>

#### **Copyright**

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

#### **Take-down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



# Consensus on the leadership of hospital CEOs and its impact on the participation of physicians in improvement projects<sup>☆</sup>

Michel L.A. Dückers<sup>a,\*</sup>, Inge Stegeman<sup>b</sup>, Peter Spreeuwenberg<sup>a</sup>, Cordula Wagner<sup>a,c</sup>, Karin Sanders<sup>b</sup>, Peter P. Groenewegen<sup>a,d</sup>

<sup>a</sup> NIVEL - Netherlands Institute for Health Services Research, Utrecht, The Netherlands

<sup>b</sup> Department of Organizational Psychology & Human Resource Development (OP&HRD), University of Twente, Enschede, The Netherlands

<sup>c</sup> EMGO-Institute, Free University Medical Centre, Amsterdam, The Netherlands

<sup>d</sup> Department of Sociology, Department of Human Geography, Utrecht University, Utrecht, The Netherlands

## ARTICLE INFO

### Keywords:

Leadership  
Diffusion of innovation  
Hospital CEO  
Physicians  
Hospitals  
The Netherlands

## ABSTRACT

**Objectives:** The success of a Dutch program to disseminate quality improvement projects depends on the participation of physicians working in program hospitals. The leadership of hospital executives (CEOs) is considered an important explanation. This study aims to determine whether the relation, between the extent to which physicians notice their CEOs stimulate improvement initiatives and the number of projects joined by physicians, is moderated by the consensus among physicians working in the same hospital.

**Methods:** Multilevel analyses are applied on data of 286 physicians from eight hospitals to: (1) estimate whether participation depends on noticing if CEOs stimulate improvement, (2) test if an individual's participation differs when more colleagues have the same opinion (effect modification).

**Results:** Significant moderator effects are found. The participation of physicians, noticing that CEOs stimulate improvement is higher when more colleagues share this opinion. For physicians not knowing whether improvement is encouraged, higher consensus coincides with lower participation.

**Conclusion:** Project involvement of physicians depends on their consensus about encouragement by CEOs. This confirms the importance of strategic leaders in dissemination programs. Further research is recommended into causes of CEO leadership visibility and methods to strengthen leadership climate.

© 2009 Elsevier Ireland Ltd. All rights reserved.

## 1. Introduction

Since the 1970s increasing attention is given to the effects of leadership in organizations. The current scien-

tific debate is often centred at the nature, causes and effects of leadership in general or particular leadership styles. It is common to express the effects of leadership in terms of productivity, job satisfaction, self efficacy, learning behaviour, organizational culture or team performance [1–3]. The leadership effect we focus on in the current study is the participation of physicians in a variety of improvement projects. It is one of the outcome measures of a change program for hospitals in the Netherlands. Better Faster pillar 3 (BFp3) aims at organizational learning and the spread of innovations. The program is based on the simultaneous implementation of several improvement projects by mul-

<sup>☆</sup> This study was funded by ZonMw, the Netherlands organization for health research and development.

\* Corresponding author at: NIVEL - Netherlands Institute for Health Services Research, PO Box 1568, 3500 BN Utrecht. Visiting address: Otterstraat 118–124, 3513 CR Utrecht. Tel.: +31 30 2729 603; fax: +31 30 2729 729.

E-mail address: [m.duckers@nivel.nl](mailto:m.duckers@nivel.nl) (M.L.A. Dückers).

**Box 1: Better Faster pillar 3.**

Better Faster pillar 3 is a national action program to stimulate transparency, efficiency and quality of care by implementing improvement projects in a selected group of hospitals in the Netherlands. Its mission: 'Realizing a substantial and appealing performance improvement in 20% of Dutch hospitals on the areas of patient logistics and patient safety. Simultaneously, a 'flywheel' is established within participating hospitals, aimed at internal spread of results and newly developed competencies.' [5]. The flywheel is a metaphor for an infrastructure enabling further improvement and dissemination. Twenty four hospitals are divided in three groups of equal size. Each group joins the program for a period of two years. In the first year teams of managers, physicians and nursing staff run improvement projects based on rapid cycle improvement. The four patient safety projects have different goals: increasing the number of safety incident reports and reduction of the prevalence of pressure ulcers, medication errors and post-operative wound infections. Three other projects affect patient logistics and have to do with increasing operation theatre productivity and reducing access time for outpatient appointments, throughput times and length of in-hospital stay. Year two is about coordinated spread of the first year projects over new departments and care processes.

tidisciplinary teams, combined with a strategic leadership program for chief executive officers (CEOs) (Box 1 contains information on BFp3) [4,5].

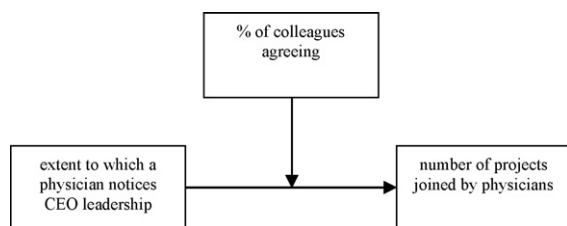
In the Netherlands hospital CEOs are responsible for formulating, preparing and executing the hospital's policy. Within the national change program, executives of participating hospitals have the explicit task to stimulate internal improvement processes and the active participation of hospital staff, and physicians in particular. Executives have a key role to fulfil in setting out the strategic course of their organization to match the program targets of sustainability and spread [6]. They are expected to communicate a vision favouring the hospital-wide spread of BFp3 improvement projects [8]. Program success requires motivation among physicians and nursing staff to implement promising techniques to improve the quality, safety and efficiency of the care delivery. The focus of this article is on the relation between the number of projects joined by physicians in eight BFp3 hospitals and a specific aspect of CEO leadership: the extent to which physicians perceive that their CEOs stimulate improvement. Secondly – because it is likely that physicians working in different hospitals perceive and experience the leadership of executives differently – we will examine whether the degree of consensus among physicians influences this relation. In the literature this degree of consensus on leadership among staff is defined as the strength of the leadership climate; an organizational characteristic with a known moderator effect [7]. By testing two hypotheses we want to answer the question whether consensus on perceived CEO change support among physicians of the same hospital influences the relation between physician's perception and participation.

**2. Theory and hypotheses****2.1. CEO leadership in a dissemination program**

The planned implementation and internal spread can only take place when projects are sufficiently supported by external change agents and internal hospital actors at all organizational levels [8,9]. When it comes to the highest level, strategic management, we know from the literature that executives play an important role in change processes [10–14]. Strategic managers determine the organization's focus and direction. Based on a review of the conditions for successful performance management Leggatt and Dwyer defined several leadership functions. Organization leaders need to: (1) create a climate where experiments and learning is encouraged; (2) articulate and communicate a clear and consistent vision; (3) enhance organizational and employee adaptability to change; and (4) provide an appropriate model, individualized support and create high performance expectations [15]. Within the dissemination program as described in Box 1 the tasks of CEOs can be summarized as: raising expectations and encouraging physicians to participate in improvement projects based on learning cycles and attendance of team training sessions. Effective executives should assure physicians that joining the projects is valuable. Still, their capability to do more than mere persuasion is limited. Dutch hospitals have a history of dual leadership. Physicians have a strong autonomy. They mostly are self-employed and usually only work in one hospital.

In all BFp3 hospitals the management has communicated to the staff that the hospital participated in a national improvement program to disseminate innovations via quality improvement collaboratives. Physicians were approached personally, in group meetings in the hospital, or by internal news letters to inform them that participation was the norm [16]. One way to address the effectiveness of hospital executives in persuading physicians to join projects, is to look at the extent to which physicians experience that CEOs stimulate improvement as demanded by the program. Tentatively, the population of physicians in each hospital can be divided in three groups. Some physicians will be aware of the norm set by the program and experience that CEOs noticeably stimulate improvement initiatives ('noticing'). A second group will be aware of the norm, but does not notice whether improvement is encouraged by their executives ('not noticing'). A third group consists of physicians that took no notion of the norm or the extent to which change is stimulated ('no idea'). Not noticing or having no idea indicates that executives fail to communicate a clear vision or are incapable of generating commitment among physicians. We expect that physicians belonging to the 'noticing' group will more often be involved in projects than the other two groups.

**Hypothesis 1.** Physicians noticing that their CEOs stimulate improvement, participate more than their colleagues who do not notice or know.



**Fig. 1.** Study model to test the moderator effect of the level of consensus among physicians.

## 2.2. Modification by leadership climate

It can be doubted, however, whether the effect of perceived CEO change support is a constant effect. Leadership notions are shaped in a complex process in which interactions with staff are indispensable [17,18]. Perceptions of leadership qualities are embedded in groups, teams and organizations [19]. Congruence between perceptions can only be defined at a higher level than the individual. This is related to organizational climate: the shared perceptions of its members on events, practices and procedures within an organization [20,21]. Recent studies show that organizational climate influences staff involvement and organizational performance [22,23]. A positive relation was found between the similarities of staff perceptions on the one hand and staff involvement and performance on the other. In addition to shared perceptions of events, practices and procedures, individuals can also agree on their perceptions of other domain specific climates, e.g. service climate, safety climate and leadership climate [7,24,25]. This study focuses on the last one. Chen and Bliese describe leadership climate as the shared perceptions about the leader [7]. In a strong leadership climate staff members are positive about the leadership and consensus is high. In a weak climate there are greater differences in perceptions and expectations [25]. Our second hypothesis is that the degree of consensus on CEO leadership in each hospital moderates the relation between a physician's leadership judgment and the average number of projects a physician joined (Fig. 1). We expect that participation is higher when a physician is positive about CEO leadership and works in a hospital environment where more of his/her colleagues agree (strong leadership climate). Higher at least than the participation of a 'not knowing' or 'not noticing' physician in a high consensus environment. The moderator effect in the last two groups may even be negative.

**Hypothesis 2.** The relation between noticing that CEOs stimulate improvement and physician participation is moderated by the consensus among colleagues of the same hospital.

## 3. Method

### 3.1. Respondents and data collection

Physicians were sampled from eight hospitals that participated in BfP3 from the end of 2004 until the end of 2006. All hospitals started their program participation in Octo-

ber 2004. Seven of the hospitals are general hospitals, one of them is a university hospital. After comparing medical specialties or departments per hospital, we found twelve departments that were present in each hospital: anaesthetics, cardiology, ear, nose and throat (ENT), general surgery, gynaecology, internal medicine, lung diseases, neurology/neurosurgery, eye surgery, pediatrics, rheumatology and urology. Five other specialties were present in seven hospitals: dermatology, orthopaedics, plastic surgery, jaw surgery and intensive care.

Per specialty physicians were selected by checking hospital websites. In the university hospital the number of physicians was much higher than in the other hospitals. Therefore, a contact person – responsible for the coordinated implementation of BfP3-projects in this hospital – selected physicians per specialty that were primarily occupied with patient care. All together, 864 physicians were assigned a unique code and received a questionnaire, accompanied by a letter stressing voluntary and anonymous participation. To maximize response, a short questionnaire was developed, A5-size, that could be sent back directly by mail without a stamp. The answers to the following questions are relevant to test the hypotheses:

- Did you participate in an improvement project last year (yes or no)?
- If so, please mark the project(s) in the list (more than one answer is possible): pressure ulcers, medication safety, postoperative wound infections, productivity of operation theatres, process redesign, access time for outpatient appointments and/or safe incident reporting (0–7 projects).
- Do you notice that improvement initiatives are stimulated by the CEOs (yes, no or no idea)?

### 3.2. Multilevel analyses

Both the dependent and independent variables in this study are based on self-reported data. Our dependent variable *participation by physicians* (PC) was computed by counting up the number of joined projects as marked by the respondents, ranging from zero to seven. An example of the nature of the independent variables is given in Table 1. The first variable is the degree to which individual physicians notice that CEOs stimulate improvement (CS11–3). Each physician belongs to one of the three opinion groups. The three columns in the middle contain (hypothetical) percentages of physicians noticing, not noticing and having no idea about CEO leadership (percentages add up to 100%). A look at these percentages enables to determine the proportion of physicians in a hospital agreeing with a given physician. The second independent variable is an interaction term, representing the percentage of colleagues with a similar leadership perception (PerSub1–3; columns at the right).

Because physicians are nested within departments within hospitals it is appropriate to use multilevel modelling [26,27]. The total variation in participation is separated into three parts due to differences between individual specialists, differences between departments and differences between hospitals. Analyzing the relations

**Table 1**  
Example based on five hypothetical physicians (1–5) in two hospitals (A and B) illustrating the nature of the independent variables in models 1 and 2.

Physician-Hospital	Individual judgement on CEO leadership (CSI)				% of physicians in CSI groups per hospital (PerHos) <sup>b</sup>				% of physicians in hospital agreeing with respondent 'moderator effect' (PerSub) (to be added to model 2) <sup>c</sup>			
	CSI1 'not noticing'	CSI2 'not knowing'	CSI3 'noticing'	(model 1) <sup>a</sup>	PerHos1 'not noticing'	PerHos2 'not knowing'	PerHos3 'noticing'		PerSub1 'not noticing'	PerSub2 'not knowing'	PerSub3 'noticing'	
1-A	1	0	0		10%	15%	75%		10	0	0	
2-A	0	1	0		10%	15%	75%		0	15	0	
3-A	0	0	1		10%	15%	75%		0	0	75	
1-B	0	1	0		33%	33.3%	33.3%		0	33.3	0	
2-B	0	0	1		33.3%	33.3%	33.3%		0	0	33.3	

<sup>a</sup> Model 1. Each physician is assigned to one of three CSI groups (yes = 1, no = 0); example: physician 1-A does not notice that the CEO supports improvement (CSI1), physician 2-B notices.

<sup>b</sup> In the PerHos1–3 columns the leadership opinion groups within the hospital are distributed (total percentage is always 100%); example: 90% of the physicians in hospital A disagrees with physician 1-A, the vast majority (75%) of the physicians notices how the CEOs stimulate change initiatives, 15% has no idea.

<sup>c</sup> Model 2. Interaction effect: for each 'yes' (1 instead of 0) the percentage of colleagues in the same hospital with the same perception is added in the second model to be tested; example: 10% of the colleagues of physician 1-A has the same opinion as case 1-A, 33.3% agrees with physician 2-B.

within and between these levels is important for being able to understand behaviour patterns in the eight hospitals [28].

Two test models are constructed. Model 1 contains three intercepts, representing the extent to which CEOs stimulate improvement is experienced as such by physicians (BL1–3). In this model the average participation per physician per group is estimated. In order to test [Hypothesis 1](#) the three intercepts are compared using Chi square tests.

In the second model the three PerSub interaction terms – the percentage of colleagues in the same hospital agreeing with a physician are added. Model 2 is used to test [Hypothesis 2](#).

The change in deviance between both models is also tested. The deviance can be regarded as a measure of lack of fit between model and data. In general, the larger the deviance (–2loglikelihood), the poorer the fit to the data. The deviance test is a tool to assess whether each next model leads to a substantial reduction in deviance compared with the previous one. For all analyses, MLwiN software version 2.02 was used. Estimation method was iterated generalized least squares (IGLS) [29].

## 4. Results

### 4.1. Degree of participation by physicians

The total response to the questionnaires was 36% ( $n=313$ ), ranging from 17% to 49% across the hospitals ([Table 2](#)). On average, physicians in the eight BFP3 hospitals participated in 1 project (SD = .91, range: 0–5); 29% did not join any project, 50% participated in 1 project, 16% in 2 projects, 4% in 3 projects, 0% in 4 projects and 1% in 5 projects. In [Table 2](#) we can see how the average participation differs between hospitals from .41 to 1.32. Physicians were asked if CEOs stimulate improvement initiatives; 55% noticed, 25% had no idea and 20% said not to notice it. The relative size of the leadership opinion groups varies between hospitals. The percentage of physicians 'noticing' ranges from 35% to 76%, the percentage 'not noticing' from 5% to 39% and 'not knowing' from 8% to 46%.

A total of 19 physicians (8%) joined the project to reduce wound infections, 30 physicians (13%) the project to improve medication safety, 31 (14%) the project to enhance operation theatre productivity, 25 (11%) the project to reduce postoperative wound infections and 37 (16%) the project to stimulate incident reporting. The participation in the two remaining logistics projects is substantially higher: 61 physicians (27%) participated in the project to reduce throughput times for diagnostics and treatment and the number of care days (process redesign), 110 (49%) were involved in the project to reduce the access time for outpatient appointments.

### 4.2. Model testing

To test both hypotheses we conducted a series of multilevel analyses ([Table 3](#)). In our data 284 physicians (with complete information) are nested within 100 departments in 8 hospitals.



**Table 2**

Response to questionnaires, average project participation by physicians and opinion groups per hospital.

Hospital	1	2	3	4	5	6	7	8	Total
Number of physicians selected	77	89	160	129	101	93	95	121	864
Number of questionnaires returned	38	40	27	61	40	39	40	28	313
Response rate (%)	49	45	17	47	40	42	42	23	36
Participation by physicians (PC) <sup>a</sup>	1.32	1.18	1.31	1.15	1.28	.72	.58	.41	1.01
Physicians not noticing (PerSub1) <sup>b</sup>	15%	5%	38%	28%	18%	13%	17%	26%	20%
Physicians not knowing (PerSub2) <sup>b</sup>	9%	21%	8%	24%	18%	37%	46%	39%	25%
Physicians noticing (PerSub3) <sup>b</sup>	76%	74%	54%	48%	64%	50%	37%	35%	55%

<sup>a</sup> Average number of projects joined.<sup>b</sup> Relative size of leadership opinion groups.

**Hypothesis 1:** In both models the average participation – or the intercept – per group was estimated (BL1–BL3). Chi square testing shows, that on average the participation of physicians noticing that executives stimulate improvement, is not significantly higher than the participation of the ones who do not notice or have no idea. The Chi square threshold value for  $p=0.05$  with 3 degrees of freedom is 7.82. In none of the models the Chi square value reaches this threshold (model 1: 2.94; model 2: 1.02).

**Hypothesis 2:** In the second model the interaction effect of consensus on the relation between individual opinion and physician participation is estimated. The tests show that there are two subgroups of physicians where consensus on CEO leadership affects the number of projects joined. Within the 'noticing' group the average participation of a physician is higher when the consensus percentage with colleagues is higher. The moderator effect is that participation is multiplied by 2.06 for every percent increase in consensus. Within the 'not knowing' group the moderator effect is negative. Participation is multiplied by  $-2.48$  if consensus within the hospital increases

by one percent. According to the deviance test, model 2 yields a significant improvement compared to model 1 ( $p<0.05$ ). In both models most of the variance in participation is located at the level of the individual physician. Variance at higher levels was equally divided between hospitals and departments, but could not be estimated as significant.

Both moderator effects, as well as the moderator effect of the 'no idea' group, are visualized in Fig. 2. In the middle of the figure a dotted vertical line is shown. Its position on the x-axis represents the average consensus per group among physicians in all eight hospitals. The alternative was to present the consensus lines on an axis, ranging from 0% to 100%. In that case the average of each moderator effect line would have been situated at different positions (55%, 25% and 20%). In the current figure, instead, the lines are centred at zero. Negative values (left from the dotted vertical line) represent the effect on participation when the consensus among colleagues in a particular hospital is below average. The positive values (on the right side of the dotted vertical line) stand for

**Table 3**

Multilevel analyses: effect of leadership judgement and consensus on physician participation.

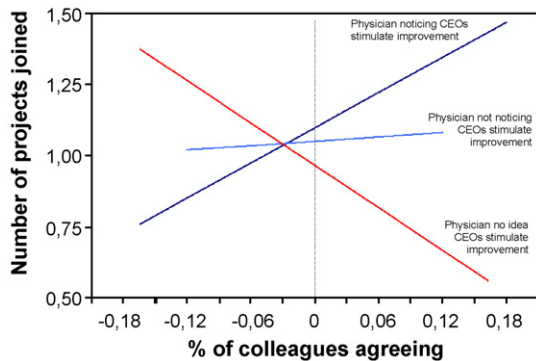
	Leadership judgment (model 1)	Model 1 + consensus among colleagues (model 2)
<b>Fixed effects</b>		
Average participation of physician*:	Intercept (SE)	Intercept (SE)
- not noticing CEOs stimulate improvement (CSI1)	1.076 (.157)	1.050 (.139)
- not knowing whether CEOs stimulate improvement (CSI2)	.905 (.141)	0.966 (.122)
- noticing CEOs stimulate improvement (CSI3)	1.112 (.119)	1.097 (.086)
Relative size of leadership opinion groups**:		B-coefficient (SE)
- percentage colleagues not noticing (PerSub1)	–	.254 (1.866)
- percentage colleagues not knowing (PerSub2)	–	–2.483 (1.121) <sup>a,b</sup>
- percentage colleagues noticing (PerSub3)	–	2.059 (.645) <sup>b</sup>
<b>Random effects</b>		
Variance components:	Variance (SE)	Variance (SE)
- between hospitals	.070 (.049)	.015 (.022)
- between departments	.085 (.051)	.083 (.050)
- between physicians	.661 (.066)	.654 (.065)
Percentage of variance at hospital and department level:	19%	13%
<b>Deviance test:</b>		
–2* loglikelihood (IGLS)	733.187	723.389
P	Reference	0.02

(n = 286).

<sup>a</sup>  $p < 0.05$ .<sup>b</sup>  $p < 0.01$ .

\* The average participation for physicians within each CSI subgroup (intercept) is estimated.

\*\* Moderator effect: where CSI represents the perception of an individual physician, PerSub variables are CSI variables multiplied by the percentage of colleagues in the same hospital with a similar opinion (Table 1).



**Fig. 2.** The moderator effect of consensus: how the participation of an individual physician in improvement projects changes when more colleagues in the same hospital share his or her leadership perception (modelled results;  $n = 286$ ). Note: The x-axis represents the consensus in each hospital. This axis is centred at zero (the zero marks the average consensus within the eight hospitals for each opinion group). Negative numbers point at a situation in which the percentage of physicians with a certain opinion is below average, positive values point at the opposite, the percentage of physicians noticing or not knowing is above average.

the participation of a physician when consensus is above average.

## 5. Discussion

### 5.1. Main findings

In this study the concept of leadership climate was used to explain the participation of physicians in improvement projects within a national change and dissemination program. We tested how the relation between physician participation and the extent to which CEOs stimulate improvement initiatives is moderated by the degree of consensus among physicians of the same hospital. On average, the participation of physicians, noticing that executives stimulate improvement, does not differ significantly from the ones having no idea or from the ones not noticing. **Hypothesis 1** is not supported by the tests. **Hypothesis 2**, however, we accept. The degree of consensus among physicians working in the same hospital moderates the relation between a physician's leadership perception and participation. Participation increases when a physician notices that CEOs favour improvement and works in a hospital where more physicians agree on this (positive modification). Participation is lower when a physician has no idea whether CEOs stimulate improvement and works in an environment where colleagues think the same (negative modification). The moderator effect of the third group – not noticing – is not significant.

The multilevel models indicate that the variance in participation is primarily located at physician level. Although variance components at hospital and department level proved not to be significant, the fact remains that in the second model 13% of the total variance is located at these levels. This percentage indicates that higher level differences probably exist, but that there is a power problem resulting from the sample size at the higher levels.

### 5.2. Theoretical and practical implications

Physician participation reaches a maximum in an environment where physician and colleagues agree that CEOs stimulate change and participation drops when physicians and their colleagues have no idea about CEO leadership. From this we conclude that every hospital CEO with intentions to encourage physicians to join improvement projects, must really give *groups* of physicians the feeling that they are stimulated. Besides visible results, interpersonal relationships and many other factors, progress in dissemination is to be made by reaching and convincing the 'no idea' group. When it comes to encouraging physicians to follow the strategic line, extension of CEO visibility is vital. In those instances when a CEO operates not as one individual, but as part of a group, CEOs must face the challenge of cooperatively sending out an unambiguous message towards the medical staff. By means of a practical solution, the CEOs can make one or more of them formally responsible for innovation and quality improvement, and communicate this within the organization accordingly.

Future research should focus on the question how management layers in between can be used as a vehicle to expand the visibility of a clear unambiguous strategic vision in favour of sustainable spread, as well as the conviction that improvement is stimulated. Stating the importance of CEO leadership is one thing, understanding its nature is another. We recommend further research into aspects of strategic leadership like priority setting, climate generation, attribution of resources, and how this contributes to the conviction of individual physicians. Moreover, it is unclear whether the effects are different in other groups of professionals like nursing staff (who traditionally have less horizontal networks than physicians), nor what the relation is with organizational characteristics such as hospital size and the state of quality management systems.

The findings presented are particularly relevant for a more distinctive branch of change management approaches in health service organizations. Our study goal was formulated from the perspective of a dissemination program in Dutch hospital care. BfP3 hospitals are involved in the implementation and internal spread of improvement projects throughout their organization. Other programs, publicly and privately funded, with similar ambitions and essentials have been launched in several countries. Again, the success of these other initiatives depends on the actual degree of dissemination of improvement methods and the participation of professionals in projects aimed at changing processes and outcomes. Many improvement programs also aim at system change, but not automatically encompass a leadership program at strategic level like BfP3. The leadership program is designed to establish a balance between changes at strategic, tactical and operational level during the period in which the hospital-wide sustainable spread strategy is shaped and implemented. Our findings say nothing about the effectiveness of the leadership program, but do support the initial assumptions of the program makers on the value of strategic leadership. The current study provides an argument for testing whether the situation in health service organizations in other dissemination programs, is comparable to the one of

BFp3. Perhaps this will add information about the value of enriching dissemination programs with distinctive leadership programs.

### 5.3. Limitations

A questionnaire was used to ask physicians whether CEOs stimulate improvement initiatives. An important limitation is that no pre-testing findings are available for the survey instrument. Future research should be conducted with validated Likert-scales.

In the current study CEO leadership has been measured as the perception of physicians. Other more objective measures are not available, but since the question was posed right after questions about the BFp3 improvement projects (effects, determinants for success or failure), the scope and sequence of the questionnaire should be a logical prelude to gain valid scores on the leadership question. All the same, this study could have been improved through in-depth interviews of physician respondents to provide reasons for physician participation.

As with many studies, the causality of the research can be questioned. This is a limitation in the sense that it is difficult to determine whether greater participation increased the number of physicians noticing leadership support or the other way around.

Finally, the risk of a non-response bias is likely. Only 33% of the intended population completely filled out the questionnaire. A total of 70% of the responding physicians has participated in one or more of the program's projects with an average of one project per physician. We cannot rule out the possibility of a systematic non-response. In that case the number of physicians that did not participate in any project is probably underrepresented.

## 6. Conclusions

In this study we analyzed the moderating effect of leadership climate within hospitals on the relation between perceived leadership of CEOs by physicians and the participation of physicians in improvement projects. The hypothesized moderator effect was confirmed. Participation reaches an optimum when a physician, who perceives that CEOs stimulate improvement, works in a hospital with more colleagues with the same perception. Participation decreases when a physician, who has no idea about encouragement by CEOs, works in a hospital where more colleagues share this perception. Hence, if an executive wants to encourage physicians in his or her hospital to join improvement projects, it is important that CEOs manage to maximize the visibility of their intended course and are successful in minimizing ambiguity. Further research is needed to acquire more detailed information on aspects of strategic leadership that make physicians feel improvement is stimulated by CEOs.

## Acknowledgements

The authors wish to thank the medical specialists who participated in this study.

## References

- [1] Carmeli A, Schaubroeck J. The influence of leaders' and other referents' normative expectations on individual involvement in creative work. *Leadership Quarterly* 2008;18:35–48.
- [2] Tsui AS, Zhang Z-X, Wang H, Xin KR, Wu JB. Unpacking the relationship between CEO leadership behavior and organizational culture. *Leadership Quarterly* 2006;17:113–37.
- [3] Mehra A, Smith B, Dixon A, Robertson B. Distributed leadership in teams: the network of leadership perceptions and team performance. *Leadership Quarterly* 2006;17:232–45.
- [4] Schellekens W, Rouppe van der Voort M, Van Splunteren P. A stone in the pond: stimulating hospitals to implement proven improvements (in Dutch). *Medisch Contact* 2003;58:1302–4.
- [5] Consortium Better Faster pillar 3. National strategy Better Faster pillar 3 (April 2004–September 2008). Utrecht/Rotterdam/Utrecht. 2004.
- [6] Dückers M, Wagner C, Groenewegen PP. Evaluating the implementation and effects of a multilevel quality collaborative in hospital care. In: Øvretveit J, Sousa PJ, editors. *Quality and safety improvement research: methods and research practice from the international quality improvement research network*. Lisbon: ENSP. UNL. MMC Karolinska Institute; 2008. p. 105–26.
- [7] Chen G, Bliese PD. The role of different levels of leadership in predicting self- and collective efficacy: evidence for discontinuity. *Journal of Applied Psychology* 2002;87:549–56.
- [8] Dückers M, Wagner C, Groenewegen PP. Determinants of a knowledge based sector wide improvement program in Dutch hospital care (in Dutch). *Acta Hospitalia* 2005;45:37–54.
- [9] Buchanan DA, Fitzgerald L, Ketley D. *The sustainability and spread of organizational change: modernizing healthcare*. New York: Routledge; 2007.
- [10] Joshi MS, Hines SC. Getting the board on board: engaging hospital boards in quality and patient safety. *Joint Commission Journal on Quality and Patient Safety* 2006;32:179–87.
- [11] Walston SL, Burns LR, Kimberly JR. Does reengineering really work? An examination of the context and outcomes of hospital reengineering initiatives. *Health Services Research* 2000;34:1363–88.
- [12] Green PL. Improving clinical effectiveness in an integrated care delivery system. *Journal for Healthcare Quality* 1998;20:4–8.
- [13] Gustafson DH, Sainfort F, Eichler M, Adams L, Bisognano M, Steudel H. Developing and testing a model to predict outcomes of organizational change. *Health Services Research* 2003;38:751–76.
- [14] Øvretveit J. The leaders role in quality and safety improvement: a review of research and guidance. *Swedish Association of Local Authorities and Regions*; 2005.
- [15] Leggatt S, Dwyer J. Factors supporting high performance in health care organizations. Melbourne: National Institute of Clinical Studies; 2003.
- [16] Dückers M, De Bruijn M, Wagner C. Evaluation Better Faster pillar 3: implementation of improvement projects in the first group of hospitals (in Dutch). Utrecht: NIVEL; 2006.
- [17] Klein KJ, House RJ. On fire: charismatic leadership and levels of analysis. *Leadership Quarterly* 2005;6:183–98.
- [18] Sherony KM, Green SG. Coworker exchange: relationships between coworkers, leader-member exchange, and work attitudes. *Journal of Applied Psychology* 2002;87:542–8.
- [19] Bowen DE, Ostroff C. Understanding HRM-firm performance linkages: the role of the "strength" of the HRM system. *Academy of Management Review* 2004;29:203–21.
- [20] Patterson MG, West MA, Shackleton VJ, Dawson JF, Lawthorn R, Maitlis S, et al. Validating the organizational climate measure: links to managerial practices, productivity and innovation. *Journal of Organizational Behavior* 2005;26:379–408.
- [21] McMurray AJ, Scott DR, Pace RW. The relationship between organizational commitment and organizational climate in manufacturing. *Human Resource Development Quarterly* 2004;15:295–311.
- [22] Patterson MG, Warr PB, West MA. Organizational climate and company performance: the role of employee affect and employee level. *Journal of Occupational and Organizational Psychology* 2004;77:216.
- [23] Schneider B, White SS, Paul MC. Linking service climate and customer perceptions of service quality: test of a causal model. *Journal of Applied Psychology* 1998;83:150–63.
- [24] Hofman DA, Stetzer A. A cross-level investigation of factors influencing unsafe behaviors and accidents. *Personnel Psychology* 1996;49:307–39.
- [25] Dorenbosch L, De Reuver R, Sanders K. Getting the HR message across: the linkage between line–HR consensus and "commitment



- strength" among hospital employees. *Management Revue* 2006;17: 274–91.
- [26] Diez Roux AV. A glossary for multilevel analysis. *Journal of Epidemiology and Community Health* 2002;56:588–94.
- [27] Leyland AH, Groenewegen PP. Multilevel modeling and public health policy. *Scandinavian Journal of Public Health* 2003;31:267–74.
- [28] Klein KJ, Kozlowski SWJ. From micro to meso: critical steps in conceptualizing and conducting multilevel research. *Organizational Research Methods* 2000;3:211–36.
- [29] Snijders TAB, Boskers RJ. *Multilevel analysis; an introduction to basic and advanced multilevel modeling*. London: Sage Publishers; 1999.